Does Europe constitute a region within the structure of the international development system?

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DOES EUROPE CONSTITUTE A REGION WITHIN THE STRUCTURE OF THE INTERNATIONAL DEVELOPMENT SYSTEM ?

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The following analysis is based on a model of national development, presented in "A Macrosociological Theory of Societal Systems with Special Reference to the International System", vol. II, Bern, Huber, 1972, edited by P. Heintz. For a short description of the model I quote P. and S. Heintz, "The Future of Development", Bern, Huber, 1973. The basic assumption of the model is the following:

> "A unit's configuration of positions on the various status lines forming the structure of the system determines the unit's movement through the structure. This assumption allows us to reconstruct the structure on the condition that the speed of the unit's movement can be related to the unit's status configuration or set of positions on the various status lines. In addition, we assume that the unit uses the chances, i.e. the direct or indirect access to the institutionalized values, offered it by the structure of the system. To the extent to which the units do so, the observation of their behavior in relation to their positions allows us to construct a model reproducing the structure of the system. This implies that we consider a system's structure as a set of mobility channels that can be inferred from observing the mobility behavior of the units. This set of channels can be reconstructed to the extent to which the unit's behavior can be expressed as a function of their positions within the system.
>
> Our model, assumed to reproduce the structure of the international system, has been constructed on the basis of statistical information available for the system's units, i.e. the nations included into our sample. This means that the structure has not been observed directly but through the unit's movements across the structure. This is not at all an unusual procedure. However, when assessing the model's adequacy the following must be considered. Since the structure is not represented exactly by the aggregated behaviors of the units and since we do not make the assumption that the structure can totally explain the behavior of the units, the question of the model's adequacy for reproducing the structure cannot be answered by measuring the degree to which the model

"explains national behavior. Taking this into consideration, the model is supposed only to maximize the degree of explanation that can be obtained from a knowledge of the nations' configurations of positions. The behavior to be explained in this way is the mobility of nations on the four status lines. Thus to begin with, we constructed a model covering the mobility behavior on each one of the four status lines. These four submodels inform us about the relationships between a given configuration of positions and the structural chances of mobility on a given status line. They combine the best set of predictors that can be obtained from the statistical information concerning the configurations of positions presented by the different nations at a certain point in time, i.e. at the start of the mobility behavior to be explained. The relative numerical size of the contribution made by each predictor of one of the four submodels to the size of the structural mobility chances varies according to the configuration of positions occupied by a nation. This variation of the relative size or weight of each predictor serves to characterize regions in the structure delineated by ranges of values on a status line.

Let us imagine a unit that has a certain configuration of positions at a certain point in time (for instance 1950) and whose movement over time is determined by the structure of the system to which the unit belongs. If we now want to trace the unit's movement over time we must take into account that its mobility on any one of the four status lines will change its configuration of positions at a later point in time (for instance 1955). It then is this changed configuration which will determine the unit's mobility over the next period of time. For this reason, the four submodels were combined into a single model which permits us to simulate behavior over time. This combined model can tell us what would be the configuration of positions of a nation in t_1 (for example 1975) on two conditions: (a) that this nation's configuration of positions in t_0 (for example 1950) is known, and (b) that the change is exclusively determined by the structure reproduced by the combined recursive model. Moreover, the model can tell us how a nation responds at time t_1 to a stimulus applied to it at time t_0. Stimulus and response represent changes in the nation's position on anyone of the different status lines. This again is an exploration of the structure of the system as reproduced by the recursive model.

For the construction of the model a multivariable, nonlinear fitting procedure of the least square type has been used, characterized by the fact that the multi-dimensional curvilinear regression line minimizes the squared distances to the points given by the available statistical information. The resulting functions (the regression equations) supposed to describe the structure are continuous. The deviations from the model, i.e. the behaviors deviating from the predictions of the model, are interpreted as due to factors being independent of the structure and having their roots

"in the unit itself, for example in the unit's culture. Conversely, if the behavior of a unit conforms to the behavior predicted by the model it is interpreted as determined by the structure of the system. The model assigns a single mobility path to each unit at each moment in time. The model is recursive in the sense that a unit's predicted mobility on any one of the status lines is fed back into the model, changing the unit's configuration of positions at a later point in time and providing the basis for new predictions of mobility, and so on. The model is closed or self-sustained in the sense that when simulated the only inputs are the feed-backs mentioned above.

All variables are aggregated on the level of nations. The simple independent variables of the model are (1) income per capita (= Gross Domestic Product per capita) (I), (2) primary and secondary education in terms of enrollments as percentages of corresponding age groups (E), (3) urbanization measured by the percentage share of the total population living in cities with 100 000 or more inhabitants (U), and (4) the differentiation of the labor force into the three sectors of agriculture, industry and services (LD = labor division). This last index assigns increasing weights to the three sectors in the order presented. The four variables are considered as operationalizations of supposedly interconnected status lines serving to describe the structure of the international development system. In addition, these status lines are supposed to be linked with each other through individuals who are the units of inter-individual systems that in turn constitute national or subnational units. The interconnections between various systems through individuals presuppose the existence of comparable values such as individual income and societal income per capita. The final selection of the four variables mentioned above is the result of many previous studies where a number of additional variables concerning intra-national conflict, external economic dependency, political regimes, and so on, were examined. In addition to these simple independent variable, all linear ratios (a^1/b^1) and products ($a^1 \cdot b^1$) of pairs of the simple independent variables have been included. These complex independent variables are intended to express relationships, i.e. interconnections, between the simple variables or status lines. Many of them have proved to be very important for predicting the values of the dependent variables. The dependent variables are operationalizations of a unit's mobility on the four status lines, i.e. the increments (or decrements) of the four simple variables (ΔI, ΔE, ΔU and ΔLD). The time periods for calculating the increments are 1950-1955, 1955-1960, and 1960-1965. The choice of these time periods has been determined by the availability of data.

In the procedure applied, those groups of independent variables (simple and complex) have been selected which best predict the increments. The simulation of the recursive model included 53 nations representing all the major world areas and all levels of development. Again, this sample was determined by the availability of complete sets of data for each nation."

Furthermore,

> "A partial derivative relates a stimulus applied at one point in time to a response at a later point in time. The partial derivative measures the multiplicator or relationship between an infinitesimal increment on one variable at a certain point in time (for example 1950) and the ensuing increment on the same or another variable at a later point in time (for example 1965). The numerical value of the partial derivative indicates the degree (strength) and direction of relatedness between the stimulus (for example ∂I 1950) and the response (for example ∂I 1965). The greater the absolute value of the partial derivative (indicating the strength of the relationship), the greater is the effect of a change of, for example, I in 1950 on the change of, for example, U in 1965. The values can be positive or negative (indicating the direction of the relationship). They are positive if the response goes in the same direction as the initial stimulus. They are negative if the response goes in the opposite direction. The partial derivative is a measure of the structural mobility chances over a certain period of time and given a certain configuration of positions in the structure."

Finally,

> "Our recursive model combines four submodels each predicting the increments of one of the four simple variables (I, E, U, LD). These increments are a function of a selection of the best predictors out of the following independent variables:
> I, E, U, LD, I/E, I/U, I/LD, E/U, E/LD, U/LD, I.E, I.U, I.LD, E.U, E.LD, and U.LD. All combinations of pairs of simple variables are included.
>
> The ratios and products express different kinds of relationships between the simple variables representing status lines. Among the best predictors the ratios are predominant. For all four submodels there are 17 best predictors, 11 of which are ratios, 3 are products and 3 are simple variables. Ratios are conceived of as operationalizations of non-substitutable values to be considered simultaneously by the actor. Products are conceived of as operationalizations of substitutable values to be taken into account at the same time. Ratios express the relative positions occupied by a unit on two status lines. Products express a relationship of substitutability of one status line for the other. Given a certain value of a product variable c (for example I.E), the value of one component simple variable a (for example I) is the reciprocal of the other component variable b (for instance E), so that: $a = c \cdot \frac{1}{b}$. In theoretical terms, simple variables and products have to do with rank tensions due to low participation in one value, and ratios have to do with disequilibria between the levels of participation in two values.

"Each independent variable chosen for its predictive power, i.e. each additive term of the function, has a coefficient and an exponent determined by the fitting procedure used. To give an example concerning the dependent variable ΔI:

$$\Delta I = 0.01\,(E \cdot \log I)^{1.21} - 0.00000003(U.LD)^{2.47} - 0.04(I/LD)^{5.50} - 0.15(E/U)^{1.05} + 1.75(I/E)^{3.48}$$

The submodels enable us to calculate for each country included into our sample the numerical contribution each additive term is making to the increments ($=\Delta$) on any one of the four status lines in each of the three periods 1950-1955, 1955-60, and 1960-65. Let us note that these increments are generated by the simulation of the corresponding submodel. Therefore, they are to be interpreted as expressing the structural chances assigned by the model to the particular configuration of status positions a given country occupies at a certain moment in time. In this connection, let us remember that the model is supposed to reproduce the structure of the international system."

In terms of previous explorations of the model the European nations belong to the region of the developed nations characterized by high contributions of the term $+I/E$ to ΔI and of the term $-LD$ to ΔLD. They also include some members of the region of the most developed nations characterized by high negative contributions of the term I/LD to ΔI and high positive contributions of the same term to ΔLD and ΔE as well as by high contributions of the term $-\log I$ to ΔU (see "A Macrosociological Theory, II, p. 154).

A finer analysis now shows that the EEC nations form a clearly distinct subregion which is different from the most highly developed nations and from the socialist and less developed European countries. The most highly developed European nations, i.e. in our sample Sweden, Norway and Switzerland, show a high degree of structural similarity to USA and New Zealand. We also find some structural differences between the EEC countries on one hand and the socialist and less developed European countries on the other.

Table 1 shows that most EEC nations occupy contiguous middle ranks on the dimension of I (= GDP p.c.). Exceptions are Italy and Ireland. Furthermore, that Switzerland, Sweden and Norway figure within the highest ranking group together with USA, New Zealand, Canada and Australia, and that the socialist countries together with all other nations included figure within the lowest ranking group.

The table also shows that the instrumentality of E for I, measured by the partial derivative $\frac{\partial I\ 1965}{\partial E\ 1950}$, is highest within the middle ranking EEC group, including Ireland, with the exception of Luxembourg; that it is clearly lower within the most developed group, with the exception of Australia, and that its value tends to decline with decreasing I within the lowest ranking group.

The table finally shows that, together with the border-line case of Luxembourg, the only significantly positive values for the instrumentality of LD for I, measured by the partial derivative $\frac{\partial I\ 1965}{\partial LD\ 1950}$, are to be found within the most developed group, with the exceptions of Canada and of Australia.

This means that with respect to I, $\frac{\partial I\ 1965}{\partial E\ 1950}$, and $\frac{\partial I\ 1965}{\partial LD\ 1950}$ the following group of countries clearly differs from the EEC nations: USA, New Zealand, Switzerland, Sweden and Norway. Luxembourg could eventually be added to this group.

Table 1

	$\frac{\Delta I\ 1965}{\Delta E\ 1950}$		$\frac{\Delta I\ 1965}{\Delta LD\ 1950}$
	(ranking order according to I (1960))		
USA	0.05	<	0.45
New Zealand	0.25	>	0.23
Canada	0.27	<	-0.29
Switzerland	0.12	<	0.18
Sweden	0.24	>	0.21
Norway	0.28	>	0.10
Australia	0.32	<	-0.65
Luxembourg	0.19	>	0.12
German Fed. Rep.	0.35	>	-0.14
Denmark	0.31	>	0.01
Great Britain	0.33	<	-0.58
France	0.31	>	0.04
Netherlands	0.35	>	-0.17
Belgium	0.31	>	0.03
Iceland	0.33	<	-0.40
CSSR	0.30	>	-0.01
Austria	0.32	>	-0.23
Italy	0.28	>	-0.05
USSR	0.28	>	-0.03
Finland	0.30	>	0.02
German Dem.Rep.	0.28	>	-0.05
Hungary	0.27	>	-0.07
Ireland	0.31	>	-0.03
Bulgaria	0.22	>	0.009
Spain	0.26	>	-0.15
Greece	0.21	>	-0.01
Portugal	0.18	>	-0.02
Yugoslavia	-0.08	>	-0.002

If we look at Table 2 we find that the values for self-instrumentality of I, measured by $\frac{\partial I\ 1965}{\partial I\ 1950}$, are lowest among nations belonging to the most developed group, with the strongly deviant cases of Switzerland and again of Canada, and that the EEC countries have middle-ranking values, with the strongly deviant exception of Ireland. There is a weak curvilinear relationship with $\frac{\partial I\ 1965}{\partial E\ 1950}$. With respect to $\frac{\partial I\ 1965}{\partial I\ 1950}$, Sweden and Norway form a group together with USA, New Zealand, Australia and Iceland. The socialist and less developed nations have clearly higher values for $\frac{\partial I\ 1965}{\partial I\ 1950}$ than the other countries.

If we consider in Table 3 the ratio between the contributions of the terms E , log I and I/E to ΔI we observe that the most developed countries have low ratios, with the exception again of Australia, and that the EEC nations have middle ratios, with the exceptions again of Luxembourg and Ireland. Luxembourg has a value similar to that of the most developed nations.

Table 4 shows that the %errors with regard to I tend to be low among the most developed nations, with the exception of New Zealand. The other two groups of nations do not present any clear trend.

If we analyze Table 5 we observe that the most developed European nations have in common the following pattern of deviation with respect to I, E and LD:

I	E	LD
-	+	+

The socialist countries, with the exception of CSSR, have in common the underestimation of LD.

Table 2

	$\frac{\partial I\ 1965}{\partial I\ 1950}$	$\frac{\partial I\ 1965}{\partial E\ 1950}$	EEC	Most developed nations
	(ranking order according to $\frac{\partial I\ 1965}{\partial I\ 1950}$)			
USA	0.90	0.05 (15)		x
Sweden	1.18	0.24 (10)		x
Norway	1.22	0.28 (6)		x
New Zealand	1.23	0.25 (9)		x
Australia	1.23	0.32 (3)		x
Iceland	1.23	0.33 (2)		
France	1.24	0.31 (4)	x	
Denmark	1.24	0.31 (4)	x	
Belgium	1.25	0.31 (4)	x	
Great Britain	1.27	0.33 (2)	x	
Netherlands	1.28	0.35 (1)	x	
Luxembourg	1.28	0.19 (13)	x	
German Fed. Rep.	1.29	0.35 (1)	x	
Finland	1.30	0.30 (5)		
Canada	1.30	0.27 (7)		x
Switzerland	1.31	0.12 (14)		x
Italy	1.31	0.28 (6)	x	
Austria	1.37	0.32 (3)		
Spain	1.37	0.26 (8)		
CSSR	1.37	0.30 (5)		
Bulgaria	1.45	0.22 (11)		
USSR	1.45	0.28 (6)		
Ireland	1.46	0.31 (4)	x	
Hungary	1.47	0.27 (7)		
German Dem.Rep.	1.51	0.28 (6)		
Greece	1.71	0.21 (12)		
Yugoslavia	4.67	-0.08 (16)		

Table 3

	Contributions of Term I/E to ΔI (1960-1965)	Contributions of Term E.log I to ΔI (1960-1965)	Contrib.of E.log I to ΔI - Contrib.of I/E (1960-1965)	
USA	4.18	13.66	3.3 (3)	x
Switzerland	3.53	8.44	2.4 (1)	x
Luxembourg	2.50	7.18	2.9 (2)	EEC
Sweden	1.82	10.10	5.5 (4)	x
New Zealand	1.49	12.38	8.3 (5)	x
Canada	1.32	12.50	9.5 (6)	x
Norway	1.01	10.47	10.4 (7)	x
German Fed.Rep.	0.91	10.16	11.2 (8)	EEC
Denmark	0.73	9.97	13.7 (9)	EEC
Australia	0.68	11.83	17.4 (11)	x
Great Britain	0.57	10.59	18.6 (12)	EEC
France	0.51	10.49	20.6 (13)	EEC
Netherlands	0.42	10.11	24.1 (14)	EEC
Italy	0.37	5.53	14.9 (10)	EEC
Austria	0.28	6.75	24.1 (15)	
Belgium	0.26	10.87	41.8 (17)	EEC
USSR	0.24	6.29	26.2 (16)	
CSSR	0.19	8.62	45.4 (18)	
Iceland	0.12	10.75	89.6 (21)	
Finland	0.11	7.80	70.9 (20)	
German Dem.Rep.	0.09	5.86	65.1 (19)	
Hungary	0.06	6.33	105.5 (22)	
Bulgaria	0.03	6.25	208.3 (25)	
Ireland	0.03	7.74	258.0 (27)	EEC
Portugal	0.02	3.35	167.5 (23)	
Spain	0.02	4.67	233.5 (26)	
Yugoslavia	0.02	3.66	183.0 (24)	
Greece	0.01	4.29	429.0 (29)	

x most developed nations

Table 4

%errors of simulated values of I compared to real values in 1965, the simulation being based von values in 1950

		EEC nations	most highly developed nations	other nations
Yugoslavia	-49.5			o
USSR	-26.8			o
German Fed.Rep.	-19.9	x		
Italy	-17.1	x		
Portugal	-16.2			o
France	- 6.6	x		
Switzerland	- 6.4		x	
Sweden	- 4.9		x	
Norway	- 4.3		x	
CSSR	- 3.6			o
Austria	- 2.4			o
Australia	- 2.4		x	
Netherlands	- 2.1	x		
Great Britain	- 1.3	x		
Canada	- 1.2		x	
Denmark	0	x		
USA	1.2		x	
Hungary	1.6			o
German Dem.Rep.	2.6			o
Belgium	2.6	x		
Finland	4.1			o
Greece	4.9			o
Spain	7.1			o
Luxembourg	10.2	x		
Iceland	10.3			o
New Zealand	11.4		x	
Bulgaria	15.4			o
Ireland	52.5	x		

Table 5

%errors of simulated values compared to real values in 1965, the simulation being based on the real values in 1950

+ = overestimations/- = underestimations/ * = errors of $\geqslant |15\%|$

	I	E	U	LD	EEC	most developed nations
Greece	+	+	+*	+*		
German Dem.Rep.	+	+	+	-		
Ireland	+*	+	-	+	x	
Luxembourg	+	+	-	+	x	
Iceland	+	-*	+	+		
Netherlands	-	+	+	+	x	
Norway	-	+	+	+		x
Switzerland	-	+*	+	+		x
Finland	+	+	-	-		
Hungary	+	+	-	-		
Spain	+	+	-	-		
Belgium	+	-*	+*	-	x	
German Fed.Rep.	-*	+	-	+	x	
Sweden	-	+	-	+		x
CSSR	-	-	+	+		
Great Britain	-	-	+*	+	x	
Bulgaria	+*	-	-	-*		
Austria	-	+	-	-		
Portugal	-*	-	+*	-		
France	-	-	-	+	x	
USSR	-*	-	-*	-		
Yugoslavia	-*	-*	-	-		
Italy	-*	+	-	o	x	
Denmark	o	+	+	-	x	

Table 6 shows the significant rank permutations produced by the simulation of the model from 1965 to 1980. We see that according to the structural chances, described by the model, the EEC nations, with the exception of the German Federal Republic, are losing rank with respect to LD, whereas the most developed European nations are gaining rank with regard to LD and are losing rank with regard to U.

Let us summarize the empirical findings:

The EEC countries are characterized by:

(1) middle ranks on GDP p.c. (exceptions: Italy and Ireland)

(2) highest values of $\frac{\partial I\ 1965}{\partial E\ 1950}$ (exception: Luxembourg)

(3) middle values of $\frac{\partial I\ 1965}{\partial I\ 1950}$ (exception: Ireland)

(4) middle values of the ratio $\frac{\text{contributions of } E \cdot \log I}{\text{contributions of } I/E}$ to ΔI (exceptions: Luxembourg and Ireland)

(5) negative rank permutations with regard to LD in the simulation of the future (exception: German Federal Republic).

The most developed nations with regard to I are USA, New Zealand, Canada, Switzerland, Sweden, Norway and Australia. These countries are characterized by:

(1) compared to the EEC nations, low values of $\frac{\partial I\ 1965}{\partial E\ 1950}$ (exception: Australia)

(2) significantly positive values of $\frac{\partial I\ 1965}{\partial LD\ 1950}$ (exceptions: Canada and Australia)

(3) lowest values of $\frac{\partial I\ 1965}{\partial I\ 1950}$ (exceptions: Switzerland and Canada)

Table 6

Simulation of the Future based on real values of 1965.
Rank permutations from 1965 to 1980
-- : considerable loss of rank
+ : considerable gain of rank

	LD	E	U	I	EEC	most developed nations
Austria	-	-		-		
Denmark	-	-			x	
German Dem.Rep.	-	-				
Belgium	-				x	
Ireland	-				x	
Italy	-				x	
Luxembourg	-				x	
Netherlands	-				x	
Great Britain	-				x	
Sweden	+	+	-			x
Switzerland	+	+	-			x
Norway	+		-			x
German Fed.Rep.	+		-		x	
Iceland	+					
Finland		-	+			
Greece		-	+			
Spain		-	+			
USSR		-				
Bulgaria				+		
Hungary				-		

(4) low ratios of $\frac{\text{contributions of E . log I}}{\text{contributions I/E}}$ to ΔI

(5) low percentage errors with regard to I (exception: New Zealand) In addition, the most developed European nations have in common the underestimation of I and the overestimation of E and LD.

(6) For the simulated period 1965-80 the most developed European nations are gaining rank with regard to LD and are losing rank with regard to U.

The European socialist and other countries, included in the sample, occupy the lowest ranks on the I dimension. These countries are characterized by:

1. a positive correlation between I and $\frac{\partial I\ 1965}{\partial E\ 1950}$
2. highest values of $\frac{\partial I\ 1965}{\partial I\ 1950}$
3. high ratios of $\frac{\text{contributions of E . log I}}{\text{contributions I/E}}$ to ΔI .

The European socialist countries are characterized by the underestimation of LD (exception: CSSR).

There is little doubt that the 9 EEC countries had a common structural basis in 1950-65 which may explain the later expansion of this group from 6 to 9 members. With regard to the 5 communalities mentioned before, the following members do not figure as exceptions: France, Belgium, Netherlands, Great Britain and Denmark. Italy and the German Federal Republic figure once, Luxembourg twice and Ireland three times.

There is also little doubt that USA, New Zealand, Switzerland,

Sweden and Norway have a strong common structural basis. Among their five communalities (points 1 to 5) mentioned, USA, Sweden and Norway do not figure as exceptions, and Switzerland and New Zealand only once.

The least developed European countries, socialist or non socialist, differ structurally from the EEC-nations and from the group of the most developed countries. However, the present analysis does not permit us to consider them as forming parts of a region of their own. The three characteristics mentioned before also apply to other less developed nations not included in our sample. A finer analysis of differences within this larger group cannot be presented here.

Anyway, only the EEC group represents, in structural terms, an exclusively European phenomenon. The other two groups have structural communalities with nations in other parts of the world.

In the following we will try to interpret our main findings. We have used the following structural indicators:

(1) I

(2) $\frac{\partial I\ 1965}{\partial E\ 1950}$

(3) $\frac{\partial I\ 1965}{\partial LD\ 1950}$

(4) $\frac{\partial I\ 1965}{\partial I\ 1950}$

(5) $\frac{\text{contributions of } E \text{ , } \log I}{\text{contributions of } I/E}$ to ΔI

(6.a) error of simulated values of I in terms of real values

(6.b) under- or overestimation of simulated values of I, E, U and LD with respect to real values.

(7) positive or negative changes or rank of I, E, U and LD-values from real to future values.

The indicators 1, 2, 3, 4, 5 and 7 provide information about properties of the structure, the indicators 6.a and 6.b about behavior vis-à-vis the structure. Indicators 2, 3, 4 and 7 give synthetic information about the structure, indicators 1 and 5 some analytic information. The interpretation should start on the basis of synthetic information and should use the analytic information as well as the information about behavior vis-à-vis the structure as theoretical inputs. Indicator 1 points to the position on the central dimension of the development system. Indicator 5 refers to the relative weights of two major development mechanisms. Indicators 6a and 6b measure the degree and kind of conformity of behavior vis-à-vis the structure. The partial derivatives 2, 3 and 4 show the positive or negative instrumentalities of one variable for the same or another variable.

In terms of synthetic indicators the EEC countries are characterized by:

(1) a relatively high instrumentality of E for I

(2) an intermediate instrumentality of I for I

(3) a future trend towards lower LD-ranks.

The most developed countries are characterized by

(1) a relatively low instrumentality of E for I

(2) a significantly positive instrumentality of LD for I

(3) a relatively low instrumentality of I for I

(4) a future trend towards higher LD-ranks

(5) a future trend towards lower U-ranks.

The other countries included in the sample are characterized by:

(1) a positive correlation between I and instrumentality of E for I

(2) a relatively high instrumentality of I for I.

We postulate that the higher the relevance of a central value the higher its self-instrumentality. Since I is the central value this proposition explains the difference between the three groups of countries with respect to $\frac{\partial I\ 1965}{\partial I\ 1950}$. The relevance of the central value diminishes with increasing participation in this value. In particular, the most highly developed group (with the exception of Canada and Switzerland) has reached a certain level of saturation of this value.

It is a most remarkable fact that in the whole world sample only the group of the most developed nations (with the exceptions of Canada and Australia) shows significantly positive values for the instrumentality of LD, i.e. the transfer of population from one economic sector to the next in the usual sequence of sectors, for I. We may call this tertiary innovation.

We guess that saturation of income p.c. and tertiary innovation are linked together and that they form part of a syndrome that may be called the post-industrial society. If this interpretation is correct the other synthetic indicators should be compatible

with it, in particular, the low instrumentality of education for economic growth as well as the trend towards increasing ranks with respect to LD and decreasing ranks with respect to U. It may be that a formal education which continues to aim at satisfying the occupational role requirements of an industrial society loses its instrumentality in a post-industrial society. The underlying assumption is a certain rigidity of the educational institution vis-à-vis the transition to a new type of society. Furthermore, the increasing rank distance with respect to LD is perfectly compatible with this type of society. Finally, we postulate that urbanization is positively associated with the level of I at which saturation is reached. This makes the loss of ranks with regard to urbanization compatible with the new type of society but does not establish a causal nexus. A level of urbanization which is relatively low compared to the level of economic development may be seen as a historical input distinguishing countries like Switzerland, Sweden, Norway, New Zealand and Canada from countries like Great Britain, German Federal Republic, Netherlands and others.

The EEC countries cannot be classified as post-industrial societies. The instrumentality of LD for I, i.e. tertiary innovation, is negligible, and the future trend is characterized by a loss of ranks with respect to LD, with the exception of the German Federal Republic. However, the relevance of the central value I, i.e. its self-instrumentality, is lower than within the less developed group but higher than among the post-industrial societies, Although the group is moving towards a certain saturation of income, its

members still have to be characterized as industrial societies.

The most distinguishing attribute of EEC nations is a high degree of instrumentality of education for economic growth, with the exception of Luxembourg. But this is by no means a necessary attribute of industrial societies.

The development of developed nations is characterized by an increasing technological lead. Technological change determines the change of the occupational structure associated with a lagging growth of general education. This technological development is reflected by the changing relative weights of the two major economic growth mechanisms mentioned before and incorporated into our model, i.e. E . log I and I/E, and operationalized as the ratio between the contributions of these two terms to ΔI. Now, this ratio clearly decreases from the less developed group over the EEC nations to the post-industrial group. This means that the underlying trend of technological development continues into the group of post-industrial societies. Automation technology may illustrate the last stage of this development.

A second linear trend refers to the above mentioned instrumentality of education. It increases with growing income p.c. and reaches a maximum among the EEC nations. This trend points to an increasingly active role of education for economic development. Increasing education affects more and more the occupational roles in a way which increases productivity through a technology which makes use of the increased education. An increase of education implies

a change in the educational stratification system, and we assume that this change induces a similar change in the occupational stratification system accompanied by an increase of productivity. Education thus assumes more and more the role of an autonomous agent of economic development. Since education falls into the realm of national autonomy this trend - culminating in the EEC countries - points to an increasing national autonomy of economic development. Now, autonomous national development is also a goal of the developing societies. But, speaking in empirical terms, the attainment of this goal seems to be conditioned by a relatively high level of income p.c. The importance of education for economic growth is shown by the fact that the economic growth mechanism incorporated into the term E . log I is highly valid throughout the international system but its relative weight is reduced among the developed nations by the term I/E. However, this mechanism leads to a high degree of instrumentality of E only under the condition of a relatively high income p.c. level. The innovation produced by the EEC nations may thus be characterized as a capital- and education-intensive industrial technology. What the developing countries really need is an education-intensive and labor-intensive technology. We guess that this innovation by the EEC nations has something to do with the goal of national economic independence especially from the USA. At the same time, it maintains the cultural hierarchies as embodied in the stratification of formal educational levels. We believe that this particular pattern is best described as late industrialism. There is no doubt that the EEC nations also show a trend towards post-bourgeois values, a trend which is empirically supported by the

relatively low self-instrumentality of I, especially in France, Denmark and Belgium, least so in Ireland, Italy and the German Federal Republic (see Table 3).

There is some resistance against the structural change towards a post-industrial society. This can be deduced from the fact that among the most developed European nations the simulated I-values underestimate the real values whereas the contrary is true for the E- and LD-values.

Let us not forget that almost all our previous discussion has been confined to an exploration of a model which is supposed to reproduce the structure of the international development system. The model intends to tell us what channels for continuous movements are provided by the structure. During the period 1950-65, there have been, among the 24 nations (4 x 24 = 96 values), 7 "disruptive" deviations ($\geq |15\%|$) with respect to I, 4 with respect to E, 5 with respect to U and only 1 with respect to LD (see Table 5).

Table 7

Groups of Countries	Disruptive over-estimations	Disruptive under-estimations	$\sum$	No of countries	No of values
Most developed European nations	1 (8%)		8%	3	12
EEC nations	3 (8%)	3 (8%)	16%	9	36
Socialist nations	1 (4%)	5 (21%)	25%	6	24
Other less developed nations	3 (13%)	2 (8%)	21%	6	24
					96

Since among the less developed nations underestimations point to successful protests against the structure, Table 7 shows that only the socialist nations manifest an appreciable amount of such a behavior. The most "conformist" nations are the three most developed ones, followed by the EEC nations. The other less developed nations show a considerable percentage of over-conformist members (13%). This points to the fact that the most developed nations have no conflict with the structure of the international system which assigns to them the role of post-industrial societies. It is their structural position which makes them innovators, and not vice-versa. The situation does not change if we add the non-European highly developed nations.

Table 8

Countries	Percentage errors 1965, the simulation being based on the real values of 1950			
	I	E	U	LD
USA	1,2	6,2	-1,0	4,6
New Zealand	11,4	-0,4	9,7	4,1
Canada	-1,2	-6,6	-4,8	-8,9
Australia	-2,4	2,3	-12,4	-0,9

None of these countries shows a disruptive behavior as defined above. If we include these countries the one deviant behavior (Switzerland with respect to the overestimation of E) represents only 4% of all values compared.

To sum up: The international development stratification system offers certain development patterns to the EEC nations (late-industrialism) and to the most developed nations (post-industrial pattern). This structural basis should be taken into account when considering the political behavior, for example membership in alliances, of these nations. In addition, one should also be aware of deviant structural chances and behavior when making predictions about particular nations.

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